SITE DESCRIPTION

MacDermid, Inc. (MacDermid) is located at 245 Freight Street in Waterbury, Connecticut. The property is positioned at approximately 41° 33′ 10″ north latitude and 73° 03′ 07″ west longitude (see Figure 1). The location was determined from the interpretation of US Geological Survey Quadrangle maps (USGS, 1984a).

MacDermid specializes in the research and development of metal finishing compounds, strippers, cleaners, electronics, plating on plastics, and surface treatments. Many of the chemicals used and/or produced at the facility and their by-products are corrosive, hazardous, and toxic. According to the EPA Form 8700, MacDermid is considered a large quantity hazardous waste generator, and a treatment, storage and disposal facility (TSDF) (EPA, 1984). MacDermid operates a Wastewater Treatment System (WWTS) which treats the rinsewaters from the metal finishing area. Any recyclable materials generated by the facility's processes are sent to MacDermid's Huntington Avenue facility for treatment or reclamation. The sludge that accumulates in the bottom of the tanks in the WWTS is pumped out and disposed of at a licensed TSDF. Presently the site is in the process of closure, and will only retain the large quantity generator status (TRCC, 1992).

MacDermid is located in downtown Waterbury in a commercial/industrial area (see Figure 2). The site is completely surrounded by a 7 foot high, steel mesh or wrought iron fence (HRP, 1991). The property is bordered by the Naugatuck River to the west, New York, New Haven and Hartford Railroad Company to the east, Freight Street to the north and undeveloped land owned by the Department of Transportation (DOT) to the south.

The site is rectangular in shape and comprises approximately 6.0 acres. Two buildings exist on the property. The Leever Building, located adjacent to the Naugatuck River, is used primarily to house executive offices, marketing and sales support, and areas for virgin chemicals and waste storage. The Research Building is used to house various hazardous waste storage areas, the WWTS, and the research and development metal finishing/printed circuit board and surface finishing testing lines (HRP, 1991).

There are seven Areas Of Concern (AOC) identified at MacDermid. The AOC's are summarized in Table 1 and are discussed in detail in Appendix A. All of the AOC's at the facility are associated with the handling of hazardous materials.

The facility is presently undergoing closure procedures at the Main Chemical Storage Area and the Flammable Storage Area (HRP, 1991). Proposed closure procedures are as follows. All wastes presently stored in these areas will be transported to a permitted hazardous waste facility. Once all wastes are removed, concrete chip samples will be collected around the wastewater treatment tanks and analyzed. In addition, a floor tile chip will be collected and analyzed from the Flammable Storage Area (HRP, 1991).

All floor tile will be subsequently removed and disposed at a permitted hazardous waste treatment facility (HRP, 1991). Floors from both area will then be cleaned by a high pressure steam cleaner. Finally, concrete chip samples and wipe samples will be collected and analyzed. Analytical results from these analyses will be compared to performance standards which are contained in the Closure Plan (HRP, 1991). If closure performance standards are not achieved, a Modified Closure Plan will be developed and submitted to EPA and the CT DEP.

SITE ACTIVITY/HISTORY

MacDermid has operated since June 1982 at the 245 Freight Street facility in Waterbury, Connecticut. Previous to this, the American Brass Company (ABC) or their subsidiaries owned the property. ABC used to make brass onsite. ABC started their operations in the late 1800s (Knause, 1992a). No other information regarding ABC operations was available.

Due to MacDermid's extensive research and development operations, many of the chemicals used at the facility are hazardous. These chemicals are used in the various laboratories. A detailed list can be found in Appendix B.

At present, the primary wastes generated by MacDermid include materials described as: metal finishing cleaners, solder strippers, electroless copper, metal hydroxide/sulfide sludge, cleaning solvents and cyanide waste. N.E. Solvents (a waste disposal company) is contracted to lab pack Research and Development samples within one week of completion of use. Most metal finishing cleaners and plating baths are sent to the MacDermid Huntington Ave. facility for reclamation (CT DEP, 1991). Table 2 summarizes the primary wastes generated at the MacDermid facility. The table includes wastes generated, quantity or volume/area, years of use/storage, years of disposal and source areas.

Various operations take place on each floor in the Leever and Research Buildings. The first and second floors of the Leever Building house the MacDermid office support. The third floor contains some office support and three laboratories. These laboratories include: a Formulation Laboratory where the research and development of plating formulations takes place for use in the metal finishing industry; the Analytical Laboratory is where samples of plating baths from customers are tested; in the Organic Synthesis Laboratory, the research and development for metal finishing products is performed. Two small satellite chemical and waste storage areas (AOC #6) are located on the third floor (CT DEP, 1991).

The Research Building contains laboratories for testing product development; protype formulations of research and development materials; research and development laboratories for inks and imaging product line; WWTS for wastewaters; and hazardous waste storage areas. The first floor of this building contains five laboratories: Research and Development Laboratory for electronic product line; the Electroless Nickel Laboratory where electroless nickel formulations are tested and fine tuned; PC boards are produced in the Applications Laboratory; the development and testing of materials for circuit boards are performed in the Organic Synthesis and Polymer Laboratory; and the Analytic Wet Laboratory is where the chemistry testing of developed products is performed. The Mill Room houses a small pilot process in which small batches of formulations are produced for testing applications in the photo imaging industry. The Main Chemical Waste Storage Area (AOC #5) and the WWTS (AOC #3) are also on the first floor, along with two Satellite Chemical and Waste Storage Areas (AOC #7). The Printed Circuit Metal Finishing Laboratory (AOC #4) is located on the

second floor as well as one Satellite Chemical and Waste Storage Area (AOC #7). There are two Research and Development laboratories and a Metal Finishing Research Laboratory on the third floor (CT DEP, 1991).

The WWTS (AOC #3), which is located in the Main Chemical and Waste Storage Area (AOC #5) is comprised of three 17,000-gallon batch treatment tanks. The system is designed to treat the rinsewaters and floor spills generated from the metal finishing areas. Each tank is used for; cyanide destruction, chrome reduction, neutralization and flocculation. Once a sufficient amount of sludge has accumulated in a tank, waste rinsewaters are diverted to the next tank in line (CT DEP, 1991). Following the clarification treatment step, the treated rinsewater in the treatment tanks is discharged to the sanitary sewer. MacDermid's discharge permit is provided by the CT DEP (HRP, 1991). The sludge which is generated is stored within the batch treatment tanks until a sufficient quantity has been collected, approximately four to five months, then pumped out by Environmental Waste Resources (EWR) (CT DEP, 1991).

Under the US EPA Classification of Hazardous Waste Activity Form (Form 8700-12), MacDermid is classified as a Generator and Storer of Hazardous Waste (EPA, 1984). A Part A Application for this facility was submitted on March 19, 1985. The hazardous waste storage capacity identified under this application was for a 10,000 gallon railroad car. This railroad car was to be used to temporarily store recyclable (reclaim) copper etchant received from MacDermid's customers and offsite facilities (HRP, 1991). The railroad car previously was situated on a 8'5" x 56' concrete platform equipped with railroad tracks in the Main Chemical and Waste Storage Area (AOC #5) (HRP, 1991). The railroad car has not been used for storage since 1985 (HRP, 1991).

A Part B Permit Application was submitted to the CT DEP on November 8, 1988 (EPA, 1988a). A revised Part A Application was submitted in conjunction with the Part B Permit.

The storage capacities specified in the revised Part A Permit included the following: (1) a 10,000-gallon railroad car for storage of reclaim waste; (2) a 15,000-gallon storage tank for

metal hydroxide sludge; (3) a 1,100-gallon container for storage of laboratory waste and (4); a 7,920-gallon container for storage of reclaim wastes (EPA, 1988b). These storage capacities were proposed storage capacities. The 10,000 railroad car was storage in the Main Chemical and Waste Storage Area (AOC #5) until 1985 (HRP, 1991). It is assumed since there were no references to the other proposed storage capacities that they were never used or built.

As a result of the CT DEP review of the November, 1988 Part B Permit Application a Notice of Deficiency (NOD) dated January 30,1990 was filed, due to the application being incomplete. A revised Part B Permit Application was submitted to the CT DEP on March 19, 1990 (McFee, 1990). On May 7, 1990. CT DEP filed a 2nd NOD (Barlow, 1990). Based on MacDermid's review of these NOD comments, the application for the Part B Permit was withdrawn (Cruice, 1990).

There have been five RCRA-Hazardous Waste inspections performed by CT DEP during the years of operation: April 24, 1987; May 10, 11, 1989; May 16, 1989; June 8, 1989; and September 16, 17, 1991. All known regulatory activities are chronologically summarized in Table 3.

ENVIRONMENTAL SETTING

The soil underlying the MacDermid facility is Urban land soils (CT Geological, 1985). These soils consist of small intermingling areas, generally less than two acres in size of Udorthents, smoothed and small areas of undisturbed soils mainly Cheshire, Charlton, Penwood, Branford, Agawam, Paxton, and Wethersfield soils. Slopes in this type of soil range from 0 to 25 percent but are dominantly 0-8 percent (USDA, 1979). Soils such as these are found in areas that are covered by buildings, paved roads, and parking lots (USDA, 1979). The bedrock underlying the site is Waterbury Gneiss which consists of gray to dark gray, fine to medium grained schist and gneiss (CT Geological, 1985).

The ground water in the area is classified "GB". This type of ground water is found within highly urbanized areas of intense industrial activities and where public water supply is available. GB ground water may not be suitable for direct human consumption due to water

APPENDIX B

LIST OF TOXIC AND HAZARDOUS SUBSTANCES USED AT MACDERMID

ATTACHMENT B

MACDERMID'S LIST OF TOXIC

AND HAZARDOUS SUBSTANCES

AND THEIR MAXIMUM QUANTITY

Chemical Name	Maximum Quantity (lbs. or Otherwise Specified
2-Amino Thiazole	284
Acetone	5000
Acetic Acid	8563
Benzoic Acid	428
Boric Acid	1413
Chromic Acid	7824
Citric Acid	6721
Ethylenedamine Tetra-Acetic Acid	2503
Erythorbic Acid	1414
Fluoboric Acid	12574
Itaconic Acid	250
Hydrochloric Acid	26913 gal.
Hydroflouric Acid	3872
Hydroxy Acetic Acid	465
Para-Hydroxy Benzoic Acid	1046
Isostearic Acid	151
DL-Malic Acid	525
Nitric Acid	12386
Oxalic Acid	7924
Phosphoric Acid	4210
Sulfamic Acid	4184
Sulfuric Acid	9890
Tartaric Acid	2318
Toluene Sulfonic Acid High Papa	538
Trichloro Acetic Acid	127
Acrylic Acid	608
Calcium Carbonate	200
Diethanol Amine Barium Sulfonate	3032
Alpha Naphthaldehyde	85
Aluminum Chloride	6790

Chemical Name	Maximum Quantity (lbs. or Otherwise Specified
Ammonium Hydroxide	4802
Ammonia Anhydrous	121801
Ammonium Bicarbonate	11337
Ammonium Bifluoride	20245
Ammonium Chloride	12297
Ammonium Citrate	246
Ammonium Nitrate	1810
Ammonium Persulfate	600
Ammonium Silico Fluoride	80
Ammonium Thicynate	269
Ammonium Xylene Sulfanate	1303
Amyl Alcohol	184
Anisil Aldehyde	350
Antimony Potassium Tartarate	75
Petroleum (Naphtha)	582
Ground Limestone	2900
Monoethyl Amine	306
Barium Sulfonate	68
Barium Sulfate	3358
Sodium Benzene Sulfinate	5093
Benzyl Chloride	475
Benzotriazole	1509
2,2 Bipyridine	297
Bismuth Subsalicylate	70
Barium Sulfate	4520
Sodium Tetraborate	9507
Butanol	1608
Butyl Cellosolve	26067
Butynediol	241
Butyl Carbitol	6083
Silicon Dioxide	869
Calcium Nitrate	1600
Sodium Alkylbenzene Sulfonate	2629
Caustic Potash	59082

Chemical Name	Maximum Quantity (lbs. or Otherwise Specified
Sodium Hydroxide	35534
Cellosolve Acetate	3943
Cellulose Acetate Butyrate	2342
Hexyl Cellosolve (Ethylene Glycol Mono-Hexyl)	45
Ethoxylated Aryl Phenol	355
Chromic Sulfate	2832
O-Chlorobenzaldehyde	1732
Cobalt Sulfate	100
Copper Chloride	2699
Copper Cyanide	1241
Copper Sulfate	116
Polyoxyethylene Thioglycol	7870
Nickel Chloride	265
2,4,-Dichloro Benzaldehyde	223
Diethylene Glycol	55
Dimethyl Formamide	4829
Dioxane	995
Dibasic Ester	556
Glycol Ether	11469
Glycol Ether Acetate	14085
Ethoxylated Phenol	3817
Ethylene Diamine	2918
Ethoxytriglycol	473
Ethylene Glycol	31946
Ferric Chloride	1245
Ferric Nitrate	1018
Ferric Sulfate	448
Silicone Dioxide	275
Potassium Perfluoroalkyl Sulfonate	920
Perfluorooctane Sulfuric Acid, Potass. Salt	215
Formaldehyde	8811 gal.
Furfuryl Alcohol	259
Glycine	1421
Vinyl Sulfonate, Sodium Salt	4337
4-(2-Hydroxy Propoxyl)-2-Butyl-1-01	660
2-Methyl 1-2, 4-Pentane Diol	2586

Chemical Name	Maximum Quantity (lbs. or Otherwise Specified
Penta-Sodium Diethylentriamine Pentaacetate	265
Tetra Sodium Ethylenediamine-Tetra Acetic Acid	5788
Hexyl Carbitol	2260
Hydrazine Hydrate	449
Hydroxylamine Sulfate	2385
Hydrogen Peroxide	61000
Hydroquinone	936
2-Hydroxethyl Methacrylate Monomer	9916
Hydroxyl Amine Hydrochloride	121
Nonylphenoxypoly (ethyleneoxy) Ethanol	4320
Octyl-Penoxy-Poly (Ethyleneoxy) Ethanol	2388
Nonphenoxypoly (Ethyleneoxy) Ethanol	3325
Octyl Phenoxy Poly (Ethyleneoxy) Ethanol	3980
Nonyl Phenoxy Poly (Ethyleneoxy) Ethanol	405
Nonylphenoxy Poly (Etheleneoxy) Ethanol	405
2-Iodothiphene	106
Alpha, Alphadimethoxy Alphaphenylatedphenone	1488
Phthalocyanine	562
N-Isobutoxymethyl Acrylamide	110
Isopropyl Alcohol	2264
2-Caprylic-1-Aminoethyl-Imidazoline Quat.	20
Mono-Sodium Phosphate	941
N,N,Dimethyl Aniline	250
N-Butyl Alcohol	300
Nonyl Phenol Polyglycol Ether	812
Nictonic Acid	110
Ethoxylated Beta Napthol	120
Nickel Chloride	1052
Nickel Sulfate	10748
Nicotinamide	140
Butyl Acetate	8495
O-Toluidine	2439
Ortho-Dichloro-Benzene	660
Potassium Peroxymonosulfate	33133
Palladium Chloride	598

Chemical Name	Maximum Quantity (lbs. or Otherwise Specified
Sodium Dimethyl Naphthalene Sulfonate	201
Phenyl Urea	159
2-Ethoxy Ethyl Ether	4800
Potassium Carbonate	140
Potassium Chloride	1320
Potassium Iodate	1370
Potassium Permanganate	6100
Potassium Sulfate	652
Propionic Acid	446
Propylene Glycol Methyl Ether	947
Alkylene Carbonate	220
Propionaldehyde	248
Propylene Glycol	2542
Potassium Salt of Silicic Acid	1931
Bis (2-Ethylhexyl) Terephthalate	1334
Lactonitrile	112
Lactose	900
Lead Acetate	116
Lauryl Ether	508
Sodium Lignosulphonate	3650
Cuprous Oxide	478
Magnesium Silicofluoride	1905
Magnesium Oxide	257
Manganese Sulfate	302
Sodium Ligno Sulfonate	6284
2-Mercaptothiazoline	150
N, N-Diethylethanol Amine	9237
Glycol Ether Acetate	8648
1-Methyl-2 Pyrrolidinone	20704
1-Clycohexyl-2-Pyrrolidinone	855
Coumarin	60
Methyl Alcohol	2418
Methyl Ethyl Ketone	731

Chemical Name	Maximum Quantity (lbs. or Otherwise Specified
Sodium Metasilicate	56336
Calcium Silicate	537
Isopropanol Amine	225
Monoethanol Amine	5060
Sodium Tetraborate	4128
Pyridine	376
Ortho Dihydroxy Benzene	902
Quinaldine Propyl Sulfobetaine	107
Tetrasodium Ethylenediamine	806
Potassium Sodium Tartarate	918
Silver Nitrate	90
Sodium Sesqui-Carbonate	8742
Sodium Carbonate	74797
Sodium Acetate	4669
Sodium Allyl Sulfonate	57384
Tetra-Sodium Pyrophosphate	3698
Sodium Benzoate	2383
Sodium Bicarbonate	1710
Sodium Chromate	1037
Sodium Bifluoride	5680
Sodium Bisulfate	123108
Sodium Bromide	249
Sodium Chloride	28507
Sodium Chlorite	5750
Sodium Chromate	455
Sodium Citrate	38
Sodium Cyanide	305
Sodium Fluoride	2797
Sodium Glucoheptonate	1709
Sodium Gluconate	2494
Sodium Hypophosphate	22314
Sodium Molybdate	2569
Sodium Silicate	3410
Sodium Nitrate	7357
Sodium Permagnate	4800
Sodium Persulfate	5005

Chemical Name	Maximum Quantity (lbs. or Otherwise Specified
Sodium Silicofluoride	1407
Sodium Stannate	1109
Sodium Sulfate	2267
Sodium Tetra Sulfide	6772
Sodium Tungstate	60
Sodium Tripolyphosphate	1807
Kerosene	519
Vanadyl Sulfate	60
Selenium	90
Stannous Chloride	7091
Stannous Sulfate	60
Stannous Oxide	764
3,6-Dimethyl-4-Octyne-3,6-Diol	55
4-Allyl Guaicol	50
Tellurium Dioxide	12
Tetra-Potassium Pyrophosphate	1400
Sodium Dimethyl Dithiocarbanate	7800
Thiourea	6780
Tetramethyl Ammonium Hydroxide	3210
Tri-Chlorobenzene	579
Triethanolamine	632
Triethylene Glycol Dimethyl Ether	226
Tripropylene Glycol	335
Trisodium Nitrilo-Triacetic Acid	228
Trisodium Phosphate	2121
Titanium Dioxide	1806
Zinc Potassium Chromate	2036
Zinc Nitrate	110
Zinc Stearate	50
Zinc Sulfate	276

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